Catalogue of American Amphibians and Reptiles.

Regester, K.J. 2000. *Plethodon richmondi*.

Plethodon richmondi Netting and Mittleman
Ravine Salamander

Plethodon richmondi Netting and Mittleman 1938:288. Type locality, "Ritter Park, Huntington, Cabell County, West Virginia at an altitude of 600–700 ft." Holotype, Carnegie Museum (CM) 14189, an adult male, collected 15 October 1939 by N.D. Richmond and N.B. Green (not examined by author).

Plethodon richmondi richmondi: Highton and Grobman 1956: 187.

Plethodon richmondi popei: Highton and Grobman 1956:187.

• **CONTENT.** No subspecies are recognized.

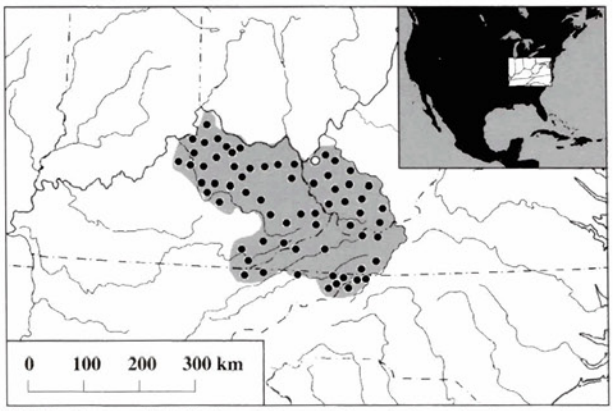
• **DEFINITION.** *Plethodon richmondi* is a small eastern *Plethodon* of the *cinereus* group. It is characterized by an elongate body with short legs that are set far apart, and is frequently described as a "worm with legs." The tail is nearly round in cross section, slightly compressed laterally, and comprises approximately 50% of TL. The TL ranges from 65–143 mm. Females are slightly larger than males. Sexually maturity is attained at approximately 40 mm SVL. Males can be distinguished by the presence of cloacal papillae and a large crescent-shaped mental gland.

In adults, the dorsum and lower sides are uniformly deep brown to nearly black and lack conspicuous markings. The entire dorsal surface is sprinkled with small gold to greenish-gold and larger silvery-white flecks. Slight to moderate amounts of white to pale gray flecking is scattered ventrolaterally, as well as on the sides of the head, where it may be particularly abundant behind the eyes. With the exception of small and irregular light blotches, similar in color to those of the lower sides, the venter is uniformly dark. The throat is lighter in color, giving a mottled effect, and has a well-developed gular fold. The undersurface of the tail is uniformly slate gray to black. The pupil of the eye is black with brassy flecks on the iris above and below.

Juveniles are similar in coloration to the adults. Hatchlings are light gray above and have an immaculate venter. The dorsum is patterned with a large number of small white spots on a network of black. Embryos have an abundance of red pigment that forms a narrow dorsal stripe in late development. The coloration may remain after hatching, frequently on the cheeks, front legs, and sides. Hatchlings measure 14–15 mm SVL.

The number of trunk vertebrae varies geographically to form a cline ranging from a mean of 22 in northern populations to 20–21 in the southeastern portion of the range. The intercostal spaces between adpressed toes number 9–11. The vomerine teeth, totaling 6–16, occur in two short series and extend to or beyond the outer edge of the internal nares. The parasphenoid teeth occur in two narrowly separated club-shaped patches. Fingers are slightly webbed at the base and 3, 2, 4, 1 in order of length. Toes are webbed to the second joint and 3, 4, 2, 5, 1 in order of length. The first fingers and first toes are located entirely within the web.

• **DIAGNOSIS.** The Ravine Salamander differs from other small eastern *Plethodon* in having a higher costal groove count (19–21), relatively longer tail, and uniformly dark venter. Although this species superficially resembles dark morph *P. dorsalis* and unstriped *P. cinereus*, the former usually has some red-orange pigment present and the latter a mottled "salt and pepper" venter. In contrast, *P. hoffmani* has a whiter throat and some white and brown mottling on the venter. *Plethodon wehrlei* is stout-bodied and has proportionally longer legs.



MAP. Range of *Plethodon richmondi*; the circle marks the type locality and dots represent most known localities.

FIGURE. Photograph of living *Plethodon richmondi* from Smyth Co., Virginia (photograph courtesy of R. Wayne Van Devender).

No known morphological characters distinguish this species from its more northern sibling species, *P. electromorphus*. Locality and differences in protein characteristics, detectable by electrophoretic analysis, distinguish the two species. Some populations of *P. electromorphus* and *P. richmondi* show a mean difference of one trunk vertebrae on either side of a contact zone along and south of the Ohio River (Highton 1999a).

• **DESCRIPTIONS.** Detailed descriptions were given by Barbour (1971), Bishop (1943), Green and Pauley (1987), Netting and Mittleman (1938), and Petranka (1998). Brief descriptions are in Behler and King (1979), Blair (1957, 1968), Cochran and Goin (1970), Conant (1958, 1975), Conant and Collins (1991, 1998), Martof et al. (1980), Redmond and Scott (1996), and Smith (1978). Wallace and Barbour (1957) described hatchlings.

• **ILLUSTRATIONS.** Conant (1958) provided a black and white drawing in lateral view. Conant (1975) and Conant and Collins (1991, 1998) provided the same line drawing of Conant (1958), but it was colored. Smith (1978) also included a color drawing of a lateral view. The venter was illustrated by the same line drawing in Conant (1958, 1975) and Conant and Collins (1991, 1998). Highton (1962) included line drawings of the mental gland and a premaxillary tooth of *P. cinereus*, "similar to *P. richmondi*." Bishop (1943) presented black and white photographs of a preserved female specimen in dorsal and ventral views. Barbour (1971), Behler and King (1979), Green and Pauley (1987), and Petranka (1998) each contained one color photograph. Petranka (1998) also contained a black and white photograph. Thurow (1968) presented photographs of a series of five *P. richmondi* and five *P. cinereus* in dorsal and ventral views.

• **DISTRIBUTION.** The species ranges from West Virginia west of the New and Kanawha rivers and south of the Teays River Valley, throughout eastern and north-central Kentucky, south to southwestern Virginia and the extremes of northwestern North Carolina and northeastern Tennessee.

The Ravine Salamander is completely terrestrial and is typically found under logs, stumps, leaf litter, and stones on the moist wooded slopes of valleys and ravines. It is rarely found on the dry crests of ridges, hilltops, or valley floors. The species has also been reported from a nearly cleared pasture in Virginia (Hoffman and Hubricht 1954). It exhibits a cover preference for rock and is frequently found in high densities on wooded talus slopes.

• **FOSSIL RECORD.** None.

• **PERTINENT LITERATURE.** Published references to the species are listed by topic: **aggression** (Thurow 1976), **antipredator behavior** (Cupp 1994, Dodd 1990), **bibliography** (Redmond et al. 1990), **biogeography** (Highton 1999a), **bionumeric code** (Brame et al. 1981), **body proportions** (Thurow 1968), **checklists** (Frost 1985; Harding 1983; Redmond et al. 1990; Schmidt 1953; Stejneger and Barbour 1939, 1943), **cladistics** (Larson et al. 1981), **common names** (Collins 1990, 1997; Collins et al. 1978, 1982; Conant et al. 1956), **courtship** (Arnold 1977), **demography** (Nagel 1979), **descriptions** (Barbour 1953, 1971; Behler and King 1979; Bishop 1943; Blair 1957, 1968; Cochran and Goin 1970; Conant 1958, 1975; Conant and Collins 1991, 1998; Green and Pauley 1987; Highton 1962; Highton and Grobman 1956; Hoffman and Hubricht 1954; Martof et al. 1980; Netting and Mittleman 1938; Petranka 1998; Redmond and Scott 1996; Smith 1978), **diagnostic characters** (Barbour 1971; Conant 1958, 1975; Conant and Collins 1991, 1998; Highton 1962, 1972, 1999a; Pauley 1979), **diet** (Hoffman and Hubricht 1954), **distribution** (Bishop 1943, Dury and Gessing 1940, Hoffman and Hubricht 1954, Seehorn 1982, Welter and Barbour 1940), **distributional interactions** (Grobman 1944, Highton 1972), **DNA** (Macgregor et al. 1973, Mizuno and Macgregor 1974, Sessions and Larson 1987), **eggs** (Wallace and Barbour 1957), **electrophoretic studies** (Highton 1999a, 1999b; Highton and Larson 1979; Larson et al. 1981; Maxon et al. 1979), **evolution** (Highton 1999a, Highton and Larson 1979, Larson et al. 1981, Maxon et al. 1979, Sessions and Larson 1987, Wake 1966), **habitat** (Barbour 1971, Bishop 1943, Netting and Mittleman 1938, Petranka 1979), **habits** (Barbour 1971, Green and Pauley 1987, Nagel 1979), **hatchlings** (Wallace and Barbour 1957), **integument** (McMahon and Pav 1982), **hybridization** (Highton 1999a, 1999b; Thurow 1968, 1969), **keys** (Barbour 1971, Bishop 1943, Blair 1968, Green and Pauley 1987, Highton 1962, Petranka 1998, Powell et al. 1998), **life cycle** (Jewell and Pauley 1995, Nagel 1979), **life history** (Petranka 1998), **limb regeneration** (Sessions and Larson 1987), **measurements** (Barbour 1953, Nagel 1979, Wallace 1969), **osteology** (Wake 1966), **parasites** (Dunbar and Moore 1979), **phenotypic variation** (Highton 1962, 1999a, 1999b; Thurow 1968), **phylogeny** (Highton 1999a, Highton and Larson 1979, Larson et al. 1981, Maxon et al. 1979, Mizuno and Macgregor 1974, Sessions and Larson 1987, Thurow 1968, Wake 1966), **range maps** (Barbour 1971; Behler and King 1979; Bishop 1943; Conant 1958, 1975; Conant and Collins 1991, 1998; Grobman 1944; Highton 1962, 1972; Smith 1978), **reproduction** (Green and Pauley 1987, Jewell and Pauley 1995, Nagel 1979, Wallace 1969), **seasonal availability** (Barbour 1971, Nagel 1979, Petranka 1979), **sexual dimorphism** (Nagel 1979, Wallace 1969), **speciation** (Highton 1999a), **state distribution maps** (Green and Pauley 1987, Martof et al. 1980, Pauley 1979, Redmond and Scott 1996, Wallace 1969), **tail enlargement** (Green and Pauley 1987), **taxonomy** (Grobman 1944, Highton 1962, Thurow 1968).

• **REMARK.** Bishop (1943) provided black and white photographs of a preserved female specimen, in dorsal and ventral views, from Bristol, West Virginia. The specimen illustrated was collected within the range of *P. electromorphus*.

• **ETYMOLOGY.** The specific name *richmondi* is a patronym honoring the Virginia-born herpetologist, Neil D. Richmond (1912–1992).

• **COMMENTS.** Until the original description of *P. richmondi* by Netting and Mittleman (1938), the species was regarded as a black morph of *P. cinereus*. Highton (1999a) demonstrated that the taxon traditionally defined as *P. richmondi* consisted of two parapatric sibling species with a mean Nei genetic distance of 0.25, and described the northern form as *P. electromorphus*. In northern Kentucky, *P. richmondi* and *P. electromorphus* hybridize in a narrow zone of contact, where the amount of introgression is low (Highton 1999b). Hybridization with *P. cinereus* also occurs on Iron and Holston Mountain, Tennessee (Thurow 1969).

Pending further investigation, these sibling species are assumed to have similar natural histories. The pertinent literature describing general habits and morphology and encompassing the geographic ranges of both species have been included (e.g., field guides, keys, major life history summaries). All other information is drawn from studies conducted only within the distribution described. Regester (2000) provides additional information on *P. electromorphus* that may be applicable.

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